

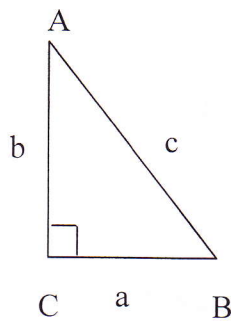
Formulas

SOHCAHTOA

Sine Law $\frac{a}{\sin \angle A} = \frac{b}{\sin \angle B} = \frac{c}{\sin \angle C}$ or $\frac{\sin \angle A}{a} = \frac{\sin \angle B}{b} = \frac{\sin \angle C}{c}$

Cosine Law $c^2 = a^2 + b^2 - 2(a)(b) \cos \angle C$

1. Solve $\triangle ABC$



(a) $\angle A = 55^\circ$, $c = 25 \text{ m} \rightarrow$ find a

$$\sin 55^\circ = \frac{a}{25}$$

$$25 \times \sin 55^\circ = \frac{a}{25} \times 25 \rightarrow a = 20.48$$

$$25 \times \sin 55^\circ = a$$

$$20.48 \text{ m} = a$$

\therefore side $a \approx 20.48 \text{ m}$

(b) $b = 25 \text{ cm}$, $c = 32 \text{ cm} \rightarrow$ find $\angle A$

$$\cos A = \frac{25}{32}$$

$$\cos^{-1}(\cos A) = \left(\frac{25}{32}\right) \cos^{-1}$$

$$A \approx 38.62^\circ$$

$\therefore \angle A$ is $\approx 38.62^\circ$

(c) $\angle B = 15^\circ$, $b = 42 \text{ m} \rightarrow$ find a

$$42 \times \frac{1}{\tan 15^\circ} = \frac{a}{42} \times 42$$

$$\frac{42}{\tan 15^\circ} = a$$

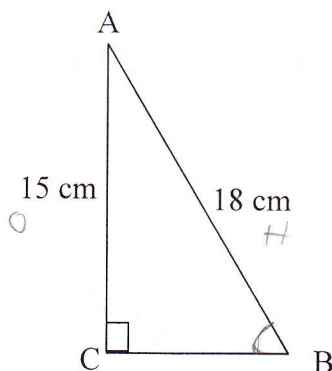
$$a \approx 156.75$$

\therefore side a is $\approx 156.75 \text{ m}$

$$\frac{a \times \tan 15^\circ}{\tan 15^\circ} = \frac{42}{\tan 15^\circ}$$

$$a \approx 156.75$$

2. Solve for angle $\angle B$



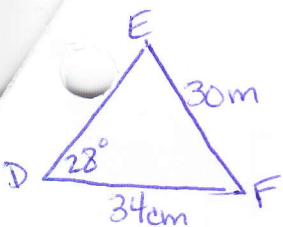
$$\sin B = \frac{15}{18}$$

$$\sin^{-1}(\sin B) = \left(\frac{15}{18}\right) \sin^{-1}$$

$$B \approx 56.44^\circ$$

$\therefore \angle B$ is $\approx 56.44^\circ$

3. Solve $\triangle DEF$ if $\angle D = 28^\circ$, $e = 34$ cm, $d = 30$ cm



$$\frac{\sin E}{34} = \frac{\sin 28^\circ}{30}$$

$$34 \times \frac{\sin E}{34} = \frac{\sin 28^\circ}{30} \times 34$$

$$\sin E = \frac{34 \sin 28^\circ}{30}$$

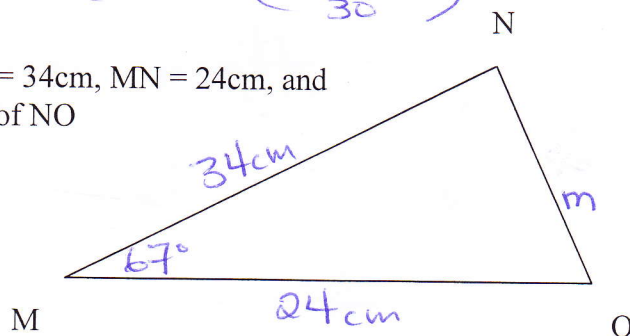
$$\sin^{-1}(\sin E) = \sin^{-1}\left(\frac{34 \sin 28^\circ}{30}\right)$$

$$\angle E = 32.14^\circ$$

$$\angle F = 180^\circ - 28^\circ - 32.14^\circ$$

$$\angle F \approx 119.86^\circ$$

4. In $\triangle MNO$, given that $MO = 34$ cm, $MN = 24$ cm, and $\angle M = 67^\circ$. Find the length of NO



$$m^2 = 24^2 + 34^2 - 2(24)(34)\cos 67^\circ$$

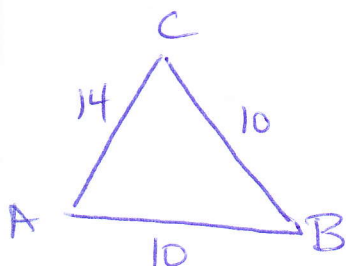
$$m^2 = 1094$$

$$\sqrt{m^2} = \sqrt{1094}$$

$$m \approx 33.07$$

\therefore side m is ≈ 33.07 cm

5. Solve $\triangle ABC$ if $a=10$, $b=14$, $c=10$ solve for $\angle A$



$$10^2 = 14^2 + 10^2 - 2(14)(10)\cos A$$

$$100 = 296 - 280\cos A$$

$$100 = 296 - 280\cos A$$

$$280\cos A = 296 - 100$$

$$\frac{280\cos A}{280} = \frac{296 - 100}{280}$$

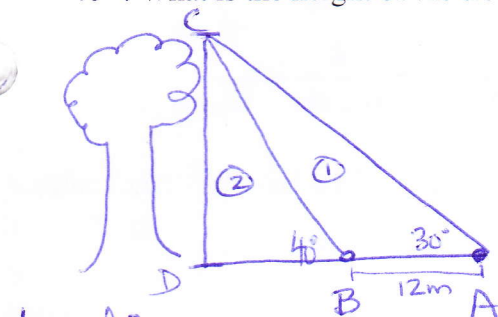
$$\cos A = 0.7$$

$$\cos^{-1}(\cos A) = (0.7)\cos^{-1}$$

$$A \approx 45.57^\circ$$

\therefore $\angle A$ is approx. 45.57°

7. To calculate the height of a tree, Jim measures the angle of elevation from a point A to be 30° . He then walks 12 feet directly towards the tree, and finds the angle of elevation from the new point to be 40° . What is the height of the tree?



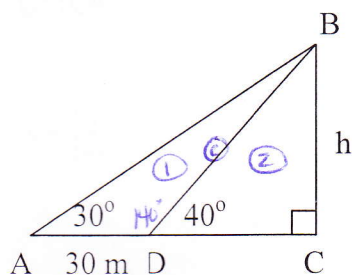
Triangle 2
 $\sin 40^\circ = \frac{b}{34.55}$

$b = 34.55 \times \sin 40^\circ$
 $b \approx 22.08m$

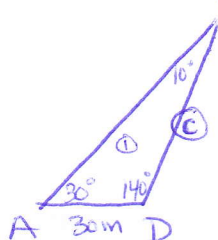
\therefore the tree is 22.08m tall

- The angle of elevation from a boat to the top of a cliff is 30° . The boat then moves 30 m closer to the cliff, making the angle of elevation 40° . Find the height of the cliff

/6



Triangle 1

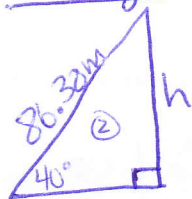


$\frac{c}{\sin 30^\circ} = \frac{30}{\sin 10^\circ}$

$c = \frac{30 \sin 30^\circ}{\sin 10^\circ}$

$c \approx 86.38m$

Triangle 2



$\sin 40^\circ = \frac{h}{86.30}$

$h = 86.30 \sin 40^\circ$

$h \approx 55.52m$

\therefore the height of the tree is 55.52m